

## Software rental system in distributed networks

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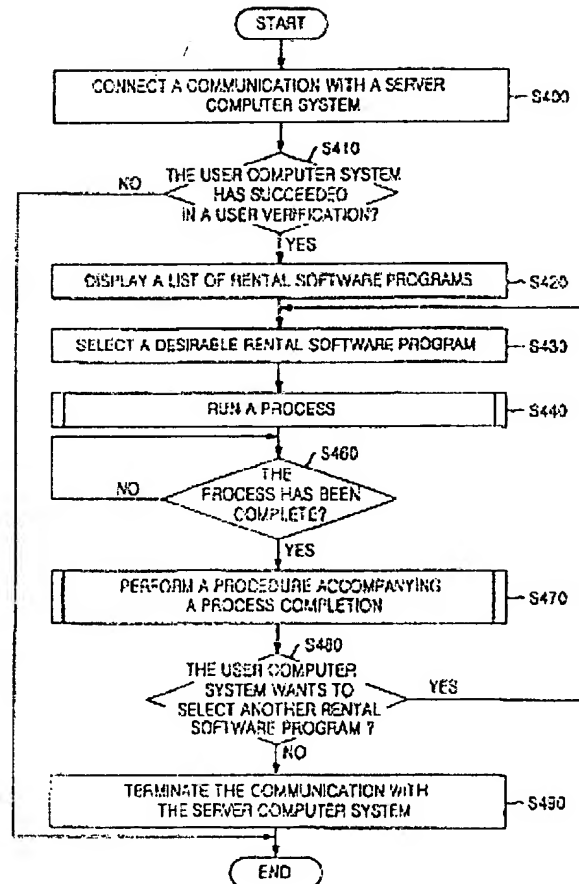
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A method for executing a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, includes the steps of: a) performing a communication connection between a user computer system and a server computer system, wherein the user computer system is based on a user-transparent program install-free technology; b) displaying a list of rental software programs downloaded from the server computer system; c) selecting a desirable rental software program in the list of rental software programs; d) downloading a main executable file associated with the desirable rental software program from the server computer system to run a process corresponding to the main executable file; and e) if the process needs one or more optional files, downloading the one or more optional files from the server computer system.



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## Software rental system in distributed networks

Description of corresponding document: **WO0046685**

### SOFTWARE RENTAL SYSTEM IN DISTRIBUTED NETWORKS

#### DescriptionTechnical Field

The present invention relates to a system and method for executing a rental software program in a distributed computing environment; and, more particularly, to a system and method for executing a rental software program in a distributed computing environment, which includes a user computer system and a server computer system, wherein the user computer system optionally requests one or more optional files associated with the rental software program to the server computer system and the server computer system provides the one or more optional files requested to the user computer system.

#### Background Art

Generally, a conventional user computer system installs a software program in a storage device. The conventional user computer system reads the primitive codes of the software program from a CD-ROM, a diskette or a server. computer system.

The primitive codes of the software program are stored in a system directory, e. g., a MicrosoftWindows"directory in a MicrosoftWindows"system provided by Microsoft Corporation, and a user directory. The system directory and the user directory have path information associated with software program files. For example, software program-files may be made up of a main executable file, auxiliary executable files, registry files and other files of \*. dll, \*. hlp and etc in a WindowsTM operating system.

The conventional user computer system needs a large storage space to store desirable software programs in the storage device.

In case where the conventional user computer system employs various software programs, the conventional user computer system should install the various software programs. Also, in case where the desirable software program is upgraded or updated, the upgraded or updated software program should be installed in the conventional user computer system.

Typically, the conventional user computer system copies or downloads software program files from the server computer system as a remote computer system in order to execute a software program. At this time, the conventional user computer system may need a specific software program file except for the copied or downloaded software program files. If the conventional user computer system has not the specific program file, the conventional user computer system can not execute the software program.

#### Disclosure of Invention

It is, therefore, an object of the present invention to provide a system for executing a rental software program in a distributed computing environment capable of reducing both a storage space of a user computer system and a start-up time of the program, which employs program files associated with the rental software program provided by a server. computer system, with an on-demand scheme and a user-transparent program install-free technology.

It is another object of the present invention to provide a method for executing a rental software program in a distributed computing environment capable of reducing both a storage space of a user computer system and a start-up time of the program, which employs program files associated with the rental software program provided by a server computer system, with an on-demand scheme and a user transparent program install-free technology.

It is further another object of the present invention to provide a computer-readable medium for executing a rental software program in a distributed computing environment capable of reducing both a storage space of a user computer system and a start-up time of the program, which employs program files associated with the rental software program provided by a server computer system, with an on-demand scheme and a user-transparent program install-free technology.

In accordance with one aspect of the present invention, there is provided a system for executing a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising: a user computer system based on a user-transparent

program install-free technology for selecting a desirable rental software program in a list of rental software programs to download the main executable file contained in the desirable rental software program and optionally requesting one or more optional files contained in the desirable rental software program; and a server computer system for providing the list of rental software programs, the main executable file contained in the desirable rental software program selected by said user computer system and the one or more optional files optionally requested from said user computer system, when a communication connection between said server computer system and said user computer system is accomplished.

In accordance with an embodiment of another aspect of the present invention, there is provided a method for executing a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising the steps of: a) performing a communication connection between a user computer system and a server computer system, wherein the user computer system is based on a user-transparent program install-free technology; b) displaying a list of rental software programs downloaded from the server computer system; c) selecting a desirable rental software program in the list of rental software programs; d) downloading a main executable file associated with the desirable rental software program from the server computer system to run a process corresponding to the main executable file; and e) if the process needs one or more optional files, downloading the one or more optional files from the server computer system.

In accordance with another embodiment of another aspect of the present invention, there is provided a method for servicing an install-free application in an online software rental system, comprising the steps of: a) getting a list of applications available for a rental service from a server computer system; b) establishing a rental session between a client computer system and the server computer system; c) fetching one or more application software from a plurality of application software stored in the server computer system; d) executing the one or more application software in the client computer system; and e) if said step d) is complete, flushing the one or more application software rented from the server computer system.

In accordance with further another aspect of the present invention, there is provided a computer-readable medium for executing a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising the steps of: a) performing a communication connection between a user computer system and a server computer system, wherein the user computer system is based on a user-transparent program install-free technology; b) displaying a list of rental software programs downloaded from the server computer system; c) selecting a desirable rental software program in the list of rental software programs; d) downloading a main executable file associated with the desirable rental software program from the server computer system to run a process corresponding to the main executable file; and e) if the process needs one or more optional files, downloading the one or more optional files from the server computer system.

#### Brief Description of Drawings

The above and other objects and features of the instant invention will become apparent from the following description of preferred embodiments taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a block diagram illustrating a system for executing a rental software program in a distributed computing environment in accordance with the present invention ;

Fig. 2 is a block diagram depicting a user computer system shown in Fig. 1;

Fig. 3 is a block diagram describing a server computer system shown in Fig. 1;

Fig. 4 is a flowchart showing a method for executing a rental software program in a distributed computing environment in accordance with the present invention;

Figs. 5A and 5B are flowcharts illustrating the procedure of running a process shown in Fig. 4;

Fig. 6 is a flowchart depicting the procedure of accompanying a process completion shown in Fig. 4;

Fig. 7 is an exemplary diagram describing a list of rental software programs displayed in a server computer system shown in Fig. 1; and

Fig. 8 is an exemplary diagram describing a list of rental software programs displayed in a user computer system shown in Fig. 1.

#### Best Mode for Carrying out the Invention

Referring to Fig. 1, there is shown a block diagram illustrating a system as an online software rental system for executing a rental software program in a distributed computing environment in accordance with the present invention. The rental program includes a main executable file and optional files, which are optionally requested from a user computer system 10. Further, the optional files include a registry file.

The "rental software program" means an application software or program rented from a server computer system to a user computer system based on a user-transparent program install-free technology. An online software rental service can be employed with Internet.

As shown, the system includes a user computer system 10, a user network device 12 as a client computer system, a server network device 14 and a server computer system 16, wherein the user computer system 10 is based on a user-transparent program install-free technology. When a communication connection between the user computer system 10 and the server computer system 16 is accomplished, the user computer system 10 can select a desirable rental software program in a list of rental software programs downloaded from the server computer system 16.

The user computer system 10 downloads a main executable file to create and run a process corresponding to the main executable file. When the process needs one or more optional files, the user computer system 10 requests the one or more optional files contained in the rental software program to the server computer system 16 via the user network device 12.

Further, the user computer system 10 may fetch the one or more optional files contained in the rental software program in the server computer system 16. The server computer system 16 provides the one or more program files contained in the rental software program to the user computer system 10 via the server network device 14. The server computer system 16 manages the one or more optional files contained in the rental software program.

Referring to Fig. 2, there is shown a block diagram depicting a user computer system 10 shown in Fig. 1. The user computer system 10 includes an interface block 200, a rental software program manager 202, a process manager 204, a storage device 205, a billing information database 206, a file monitor 208 and a protector 210.

The interface block 200 is interfaced between the user computer system 10 and the user network device 12 shown in Fig.

1. For example, the interface block 200 outputs a message requesting one or more optional files contained in a rental software program to a server computer system 16 via the user network device 12 and a server network device 14 shown in Fig.

1. Further, The interface block 200 receives the one or more optional files from the server computer system 16.

When a communication connection between the user computer system 10 and the server computer system 16 is accomplished, the user computer system 10 receives a list of rental software programs from the server computer system 16. The user computer system 10 selects a desirable rental software program in the list of rental software programs by using a selection device (not shown). Then, the user computer system 10 receives a main executable file and a list of optional files contained in the selected rental software program from the server computer system 16.

The rental software program manager 202 converts registry file information contained in the list of optional files into registry file information appropriate to the user computer system 10.

The process manager 204 creates and runs a process corresponding to the main executable file contained in the selected rental software program. If the process needs the one or more optional files, the process manager 204 suspends the process until the process manager 204 receives the one or more optional files from the server computer system 16.

The storage device 205 stores the main executable file, the one or more optional files and the list of optional files.

Further, when the process is complete, the main executable file and the one or more optional files stored in the storage device 205 are flushed by the process manager 204.

The billing information database 206 stores billing information associated with a billing start time and a billing end time and a name of the rental software program selected by the user computer system 10. Further, the user computer system 10 sends the billing information associated with the billing start time and the billing end time to the server computer system 16.

The file monitor 208 monitors the process to determine whether the process needs the one or more optional files during the process is running. If the process needs the one or more optional files during the process is running, the file monitor 208 hooks a message requesting the one or more optional files from the process. The file monitor 208 requests the one or more optional files to the server computer system 16.

The protector 210 protects the rental software program including the main executable file and the one or more optional files from an unauthorized use committed by the user computer system 10.

Referring to Fig. 3, there is shown a block diagram describing a server computer system 16 shown in Fig. 1. As shown, the server computer system 16 includes an interface block 300, a user verification module 301, a user-information database 302, a billing module 303, a log database 304, a transmission control module 305, a central processing unit 306, a rental software program-information database 307, a rental software program analyzer 308, a storage device 309 and a schedule manager 310 and a session manager 311.

The interface block 300 is interfaced between the server computer system 16 and the server network device 14 shown in

Fig. 1. For example, the interface block 300 receives a message requesting one or more optional files associated with a rental software program from a user computer system 10 via the server network device 14 as shown in Fig. 1. Further, the interface block 300 outputs the one or more optional files requested from the user computer system 10 to the server computer system 16.

When a communication connection between the user computer system 10 and the server computer system 16 is accomplished, the user verification module 301 verifies the user computer system 10 or a user by using identification information of the user computer system 10 or the user stored in the userinformation database 302.

The user-information database 302 stores the identification information of the user computer system 10 and billing information of the user computer system 10.

The billing module 303 processes charge or fee to be paid for the usage of the main executable file and the one or more optional files contained in the rental software program provided from the server computer system 16 to the user computer system 10.

The log database 304 stores information, e. g., a log file, necessary for recovering the server computer system 16 when the server computer system 16 is not operable due to a serious error.

When the user computer system 10 requests the one or more optional files to the server computer system 16, the transmission control module 305 obtains the one or more optional files from the storage device 309. After the transmission control module 305 obtains the one or more optional files, the transmission control module 305 transmits the one or more optional files via the session manager 311 to the user computer system 10.

The central processing unit 306 informs other components whether user verification and billing are successful or not.

Further, when the server computer system 16 is not operable due to the serious error, the central processing unit 306 recovers the server computer system 16 by using the log file stored in the log database 304.

The rental software program-information database 307 stores the path information of main executable files associated with rental software programs, a list of rental software programs as main executable files and a list of optional files associated with a corresponding rental software program.

When a new rental software program is installed in the server computer system 16, the rental software program analyzer 308 analyzes a new rental software program. Then, the rental software program analyzer 308 stores the path information of a main executable file and a list of optional files, associated with the new rental software program, in the rental software program-information database 307.

The storage device 309 stores the main executable file and the one or more optional files associated with the rental software program corresponding to the path information.

The schedule manager 310 manages a schedule of requests from the user computer system and other user computer systems (not shown).

The session manager 311 manages a communication session between the user computer system 10 and the server computer system 16.

Referring to Fig. 4, there is shown a flowchart showing a method for executing a rental software program in a distributed computing environment in accordance with the present invention.

The rental software program includes a main executable file and one or more optional files including a registry file.

As shown, at stepS400, a communication connection between a user computer system and a server computer system is accomplished.

At step S410, it is determined whether the user computer system has succeeded in user verification. At this time, a user verification module contained in the server computer system verifies the user computer system or a user by using identification information of the user computer system or the user stored in a user-information database contained in the server computer system.

At step S420, if the user computer system is verified, the user computer system displays a list of rental software programs downloaded from the server computer system, e. g., a rental software program-information database contained in the server computer system.

At stepS430, the user computer system selects a desirable rental software program in the list of rental software programs.

At stepS440, the user computer system downloads a main executable file and a list of optional files associated with the desirable rental software program from the server computer system. At this time, a process manager contained in the user computer system creates and runs a process corresponding to the main executable file.

At stepS460, it is determined whether the process has been complete.

At step S470, if the process has been complete, a procedure accompanying a process completion is performed.

At step S480, it is determined whether the user computer system wants to select another rental software program.

At step S490, if the user computer system does not want to select another rental software program, the user computer system terminates the communication with the server computer system. On the other hand, if the user computer system wants to select another rental software program, the steps S430 andS490 are repeated.

Referring to Figs. 5A and 5B, there are shown flowcharts illustrating the procedure of running a process shown in Fig.

4.

As shown, at step S441, the user computer system downloads a main executable file and a list of optional files from the server computer system.

At stepS442, a rental software program manager contained in the user computer system converts registry file information contained in the list of optional files into registry file information appropriate to the user computer system.

At step S443, the user computer system runs a file monitor and a protector, which protects the rental software program including the main executable file and the one or more optional files from an unauthorized use committed by the user computer system.

At step S444, a billing information database contained in the user computer system stores a name of a rental software program selected by the user computer system and a billing start time.

At stepS445, the user computer system informs the server computer system of the billing start time. Further, a user-information database contained in the server computer system stores information of the billing start time from the user computer system.

At stepS446, a process manager contained in the user computer system creates and runs a process corresponding to the main executable file.

At stepS447, the file monitor monitors the process to determine whether the process needs one or more files. Further the file monitor hooks a message requesting one or more optional files from the process to request the one or more optional files to the server computer system by using an on-demand scheme.

At stepS448, it is determined whether the user computer system has the one or more optional files requested.

At stepS449, if the user computer system has the one or more optional files requested, the process manager re-runs the process with the one or more optional files existing in the user computer system.

At step S450, if the user computer system has not the one or more optional files, the process manager suspends the process.

At step S451, the process manger downloads the one or more optional files from the server computer system. At this time, the server computer system sends the one or more optional files stored in a storage device of the server computer system to the user computer system via a session manager.

At stepS452, the process manager re-runs the process with the one or more optional files downloaded from the server computer system.

Referring to Fig. 6, there is shown a flowchart depicting the procedure of accompanying a process completion shown in Fig.

4.

At stepS471, if the process has been complete, the user computer system terminates the file monitor and the protector.

At step S472, the user computer system stores a billing end time in the billing information database.

At stepS473, the user computer system informs the server computer system of the billing end time. The server computer system stores information of the billing end time in the user-information database. A billing module contained in the server computer system processes charge or fee to be paid for the usage of the main executable file and the one or more optional files contained in the rental software program provided from the server computer system to the user computer system.

At step S474, the user computer system flushes the main executable file and the one or more optional files stored in the storage device of the user computer system.

The method for executing the rental software program in the distributed computing environment in accordance with the present invention can be stored in a computer-readable medium, e. g. an optical disk, a hard disk and so on.

Referring to Fig. 7, there is shown an exemplary diagram describing a list of rental software programs displayed in a server computer system shown in Fig. 1. For example, the list of rental software programs includes rental software programs of Winword. exe, Powerpnt. exe, Excel. exe, Photoshp. exe and AcroRd32. exe as shown in Fig. 7.

Referring to Fig. 8, there is shown an exemplary diagram describing a list of rental software programs displayed in a user computer system shown in Fig. 1. For example, the list of rental software programs includes rental software programs of MS word, MS PowerPoint, MS Excel, Adobe PhotoShop, Winamp and ACDSee-graphic Viewer as shown in Fig. 8.

Although the preferred embodiments of the invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

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## Software rental system in distributed networks

Claims of corresponding document: WO0046685

### Claims

1. A system for executing a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising:  
a user computer system based on a user-transparent program install-free technology for selecting a desirable rental software program in a list of rental software programs to download the main executable file contained in the desirable rental software program and optionally requesting one or more optional files contained in the desirable rental software program; and  
a server computer system for providing the list of rental software programs, the main executable file contained in the desirable rental software program selected by said user computer system and the one or more optional files optionally requested from said user computer system, when a communication connection between said server computer system and said user computer system is accomplished.
2. The system as recited in claim 1, wherein said user computer system includes:  
a storage means for storing the main executable file, the one or more optional files contained in the desirable rental software program and a list of optional files downloaded from said server computer system;  
a process manager means for creating and running a process corresponding to the main executable file; suspending the process if the process requests the one or more optional files; and re-running the process if said process manager means receives the one or more optional files from said server computer system; and  
a monitor means for monitoring the process to determine whether the process requests the one or more optional files and hook a message requesting the one or more optional files from the process; and requesting the one or more optional files to said server computer system by using an on-demand scheme.
3. The system as recited in claim 2, wherein the list of optional files is sent from said the server computer system when the main executable file is sent from said server computer system, wherein the optional files includes a registry file.
4. The system as recited in claim 3, wherein said user computer system further includes:  
a protection means for protecting the rental software program rented from said server computer system to prevent an unauthorized use committed by said user computer system;  
a converting means for converting registry file information contained in the list of optional files into registry file information appropriate to said user computer system; and  
a billing database for storing billing information.
5. The system as recited in claim 4, wherein the billing information includes a billing start time, a billing end time and a name of the rental software program selected by said user computer system.
6. The system as recited in claim 5, wherein said process manager means flushes the main executable file and the one or more optional files stored in said storage means when the process is complete.
7. The system as recited in claim 1, wherein said server computer system includes:  
a verification means for verifying said user computer system by using identification information of said user computer system stored in a user-information database;  
a program database for storing path information of the main executable file, a list of rental software programs and a list of the optional files;  
a analyzing means for analyzing a new rental software program when the new rental software program is installed in said server computer system, wherein said analyzing means stores the path information of the main executable file and a list of the optional files, associated with the new rental software program, in said database;  
a storage means for storing the main executable file and the one or more optional files; and  
a means for obtaining and sending the main executable file stored in said storage means when said user computer system selects the desirable rental software program; and obtaining and sending the one or more optional files stored in said storage means when said user computer system optionally requests the one or more optional files to said server computer system.
8. The system as recited in claim 7, wherein said server computer system further includes:  
a billing means for processing charge or fee to be paid for the usage of the main executable file and the one or more optional files associated with the rental software program provided to said user computer system;  
a log database for storing a log file necessary for recovering said server computer system when said server



computer system is not operable due to a serious error;  
a recovery means for recovering said server computer system by using the log file stored in said log database when said server computer system is not operable due to the serious error;  
a schedule management means for managing a schedule of requests from said user computer system and another user computer system; and  
a session management means for managing a communication session between said user computer system and said server computer system.

9. The system as recited in claim 8, wherein the list of optional files is sent to said the user computer system when the main executable file is sent to said user computer system, wherein the optional files includes a registry file.

10. A method for executing a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising the steps of:  
a) performing a communication connection between a user computer system and a server computer system, wherein the user computer system is based on a user-transparent program install-free technology;  
b) displaying a list of rental software programs downloaded from the server computer system;  
c) selecting a desirable rental software program in the list of rental software programs ;  
d) downloading a main executable file associated with the desirable rental software program from the server computer system to run a process corresponding to the main executable file; and  
e) if the process needs one or more optional files, downloading the one or more optional files from the server computer system.

11. The method as recited in claim 10, wherein said step a) includes the steps of:  
a1) performing the communication connection between the user computer system and the server computer system; and  
a2) verifying the user computer system in the server computer system.

12. The method as recited in claim 10, wherein said step d) includes the steps of:  
d1) downloading the main executable file and a list of optional files from the server computer system, wherein the optional files include a registry file ;  
d2) converting registry file information contained in the list of optional files into registry file information appropriate to the user computer system;  
d3) running a file monitor and a protector, which protects the rental software program including the main executable file and the one or more optional files from an unauthorized use committed by the user computer system;  
d4) storing a name of the rental software program selected by the user computer system and a billing start time in a billing information database of the user computer system;  
d5) informing the server computer system of the billing start time; and  
d6) creating and running the process corresponding to the main executable file.

13. The method as recited in claim 12, wherein said step e) includes the steps of:  
e1) monitoring the process in the file monitor in order to determine whether the process needs the one or more optional files ;  
e2) if the process needs the one or more optional files, hooking a message requesting the one or more optional files from process;  
e3) suspending the process until the user computer system downloads the one or more optional files from the server computer system; and  
e4) if the user computer system downloads the one or more optional files from the server computer system, re-running the process.

14. The method as recited in claim 11, wherein said step e4) further includes the steps of:  
e4-a) determining whether the process has been complete;  
e4-b) if the process has been complete, performing a procedure accompanying a process completion;  
e4-c) determining whether the user computer system wants to select another rental software program;  
e4-d) if the user computer system wants to select the another rental software program, repeating said steps c) to e4-d); and  
e4-e) if the user computer system does not want to select the another rental software program, terminates the communication connection between the user computer system and the server computer system.

15. The method as recited in claim 14, wherein said step e4-b) includes the steps of:  
e4-b1) if the process has been complete, terminating the file monitor and the protector;  
e4-b2) storing a billing end time in the billing information database of the user computer system;  
e4-b3) informing the server computer system of the billing end time; and  
e4-b4) flushing the main executable file and the one or more optional files stored in the storage device of the

user computer system.

16. A method for servicing an install-free application in an online software rental system, comprising the steps of:

- a) getting a list of applications available for a rental service from a server computer system;
- b) establishing a rental session between a client computer system and the server computer system;
- c) fetching one or more application software from a plurality of application software stored in the server computer system;
- d) executing the one or more application software in the client computer system; and
- e) if said step d) is complete, flushing the one or more application software rented from the server computer system.

17. The method as recited in claim 16, wherein the list of applications contained in said step a) is established on Internet.

18. The method as recited in claim 16, wherein the one or more application software contained in said step c) includes a main executable file.

19. The method as recited in claim 16, wherein the one or more application software contained in said step c) is authorized by the server computer system.

20. The method as recited in claim 18, wherein said step d) includes the steps of:

- d1) creating a process corresponding to the main executable file;
- d2) running the process;
- d3) monitoring additional requests to access related files from the process by message hooking and file monitoring while the process is running;
- d4) if the process needs any related file, generating a message requesting one or more related files and transmitting the message to the server computer system to fetch the one or more related files based on an on-demand scheme; and
- d5) re-running the process after the one or more related files are delivered to the client computer system.

21. A computer-readable medium for executing a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising the steps of:

- a) performing a communication connection between a user computer system and a server computer system, wherein the user computer system is based on a user-transparent program install-free technology;
- b) displaying a list of rental software programs downloaded from the server computer system;
- c) selecting a desirable rental software program in the list of rental software programs;
- d) downloading a main executable file associated with the desirable rental software program from the server computer system to run a process corresponding to the main executable file; and
- e) if the process needs one or more optional files, downloading the one or more optional files from the server computer system.

22. The computer-readable medium as recited in claim 21, wherein said step a) includes the steps of:

- a1) performing the communication connection between the user computer system and the server computer system; and
- a2) verifying the user computer system in the server computer system.

23. The computer-readable medium as recited in claim 21, wherein said step d) includes the steps of:

- d1) downloading the main executable file and a list of optional files from the server computer system, wherein the optional files include a registry file ;
- d2) converting registry file information contained in the list of optional files into registry file information appropriate to the user computer system;
- d3) running a file monitor and a protector, which protects the rental software program including the main executable file and the one or more optional files from an unauthorized use committed by the user computer system;
- d4) storing a name of the rental software program selected by the user computer system and a billing start time in a billing information database of the user computer system;
- d5) informing the server computer system of the billing start time; and
- d6) creating and running the process corresponding to the main executable file.

24. The computer-readable medium as recited in claim 23, wherein said step e) includes the steps of:

- e1) monitoring the process in the file monitor in order to determine whether the process needs the one or more optional files;

e2) if the process needs the one or more optional files, hooking a message requesting the one or more optional files from process;  
e3) suspending the process until the user computer system downloads the one or more optional files from the server computer system; and  
e4) if the user computer system downloads the one or more optional files from the server computer system, re-running the process.

25. The computer-readable medium as recited in claim 22, wherein said step e4) further includes the steps of:

e4-a) determining whether the process has been complete;  
e4-b) if the process has been complete, performing a procedure accompanying a process completion;  
e4-c) determining whether the user computer system wants to select another rental software program;  
e4-d) if the user computer system wants to select the another rental software program, repeating said steps c) to e4-d); and  
e4-e) if the user computer system does not want to select the another rental software program, terminates the communication connection between the user computer system and the server computer system.

26. The computer-readable medium as recited in claim 25, wherein said step e4-b) includes the steps of:

e4-b1) if the process has been complete, terminating the file monitor and the protector;  
e4-b2) storing a billing end time in the billing information database of the user computer system;  
e4-b3) informing the server computer system of the billing end time; and  
e4-b4) flushing the main executable file and the one or more optional files stored in the storage device of the user computer system.

#### AMENDED CLAIMS

[received by the International Bureau on 05 July 2000 (05.07.00); original claims 1-3,7,9,10,21-26 amended; new claims 27 to 41 added ;  
remaining claims unchanged; (13 pages)]

1 (Amended). A system for renting a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising:  
a user computer system based on a user-transparent program install-free technology for downloading the main executable file contained in the rental software program and optionally requesting one or more optional files contained in the rental software program; and  
a server computer system for providing the main executable file contained in the rental software program to be executed in said user computer system and the one or more optional files optionally requested from said user computer system.

2(Amended). The system as recited in claim 1, wherein said user computer system includes:  
a storage means for storing the main executable file, the one or more optional files contained in the rental software program and a list of optional files downloaded from said server computer system;  
a process manager means for creating and running a process corresponding to the main executable file;  
suspending the process if the process requests the one or more optional files; and re-running the process if said process manager means receives the one or more optional files from said server computer system; and  
a monitor means for monitoring the process to determine whether the process requests the one or more optional files; and hooking a message requesting the one or more optional files from the process; and  
requesting the one or more optional files to said server computer system by using an on-demand scheme.

3(Amended). The system as recited in claim 2, wherein said server computer system sends the list of optional files to said user computer system when said server computer sends the main executable file to said user computer system and wherein the optional files includes a registry file.

4. The system as recited in claim 3, wherein said user computer system further includes:  
a protection means for protecting the rental software program rented from said server computer system to prevent an unauthorized use committed by said user computer system;  
a converting means for converting registry file information contained in the list of optional files into registry file information appropriate to said user computer system; and  
a billing database for storing billing information.

5. The system as recited in claim 4, wherein the billing information includes a billing start time, a billing end time and a name of the rental software program selected by said user computer system.

6. The system as recited in claim 5, wherein said process manager means flushes the main executable file and the one or more optional files stored in said storage means when the process is complete.

7(Amended). The system as recited in claim 1, wherein said server computer system includes:

a verification means for verifying said user computer system by using identification information of said user computer system stored in a user-information database;  
a program database for storing path information of the main executable file, a list of rental software programs and a list of the optional files;  
an analyzing means for analyzing a new rental software program when the new rental software program is installed in said server computer system, wherein said analyzing means stores the path information of the main executable file and a list of the optional files, associated with the new rental software program, in said program database;  
a storage means for storing the main executable file and the one or more optional files; and  
a means for obtaining and sending the main executable file stored in said storage means when said user computer system selects the desirable rental software program; and obtaining and sending the one or more optional files stored in said storage means when said user computer system optionally requests the one or more optional files to said server computer system.

8. The system as recited in claim 7, wherein said server computer system further includes:  
a billing means for processing charge or fee to be paid for the usage of the main executable file and the one or more optional files associated with the rental software program provided to said user computer system;  
a log database for storing a log file necessary for recovering said server computer system when said server computer system is not operable due to a serious error;  
a recovery means for recovering said server computer system by using the log file stored in said log database when said server computer system is not operable due to the serious error;  
a schedule management means for managing a schedule of requests from said user computer system and another user computer system; and  
a session management means for managing a communication session between said user computer system and said server computer system.

9(Amended). The system as recited in claim 8, wherein said server computer system sends the list of optional files to said user computer system when said server computer system sends the main executable file to said user computer system and wherein the optional files includes a registry file.

10 (Amended). A method for renting a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising the steps of:  
a) performing a communication connection between a user computer system and a server computer system, wherein the user computer system is based on a user-transparent program install-free technology;  
b) displaying a list of rental software programs downloaded from the server computer system;  
c) selecting the rental software program in the list of rental software programs;  
d) downloading a main executable file associated with the rental software program from the server computer system to run a process corresponding to the main executable file; and  
e) if the process needs one or more optional files, downloading the one or more optional files from the server computer system.

11. The method as recited in claim 10, wherein said step a) includes the steps of:  
a1) performing the communication connection between the user computer system and the server computer system; and  
a2) verifying the user computer system in the server computer system.

12. The method as recited in claim 10, wherein said step d) includes the steps of:  
d1) downloading the main executable file and a list of optional files from the server computer system, wherein the optional files include a registry file;  
d2) converting registry file information contained in the list of optional files into registry file information appropriate to the user computer system;  
d3) running a file monitor and a protector, which protects the rental software program including the main executable file and the one or more optional files from an unauthorized use committed by the user computer system;  
d4) storing a name of the rental software program selected by the user computer system and a billing start time in a billing information database of the user computer system;  
d5) informing the server computer system of the billing start time; and  
d6) creating and running the process corresponding to the main executable file.

13. The method as recited in claim 12, wherein said step e) includes the steps of:  
e1) monitoring the process in the file monitor in order to determine whether the process needs the one or more optional files;  
e2) if the process needs the one or more optional files, hooking a message requesting the one or more

optional files from process;

e3) suspending the process until the user computer system downloads the one or more optional files from the server computer system; and  
e4) if the user computer system downloads the one or more optional files from the server computer system, re-running the process.

14. The method as recited in claim 11, wherein said step e4) further includes the steps of:

e4-a) determining whether the process has been complete;  
e4-b) if the process has been complete, performing a procedure accompanying a process completion;  
e4-c) determining whether the user computer system wants to select another rental software program;  
e4-d) if the user computer system wants to select the another rental software program, repeating said steps c) to e4-d); and  
e4-e) if the user computer system does not want to select the another rental software program, terminates the communication connection between the user computer system and the server computer system.

15. The method as recited in claim 14, wherein said step e4-b) includes the steps of:

e4-b1) if the process has been complete, terminating the file monitor and the protector;  
e4-b2) storing a billing end time in the billing information database of the user computer system;  
e4-b3) informing the server computer system of the billing end time; and  
e4-b4) flushing the main executable file and the one or more optional files stored in the storage device of the user computer system.

16. A method for servicing an install-free application in an online software rental system, comprising the steps of:

a) getting a list of applications available for a rental service from a server computer system ;  
b) establishing a rental session between a client computer system and the server computer system;  
c) fetching one or more application software from a plurality of application software stored in the server computer system;  
d) executing the one or more application software in the client computer system; and  
e) if said step d) is complete, flushing the one or more application software rented from the server computer system.

17. The method as recited in claim 16, wherein the list of applications contained in said step a) is established on Internet.

18. The method as recited in claim 16, wherein the one or more application software contained in said step c) includes a main executable file.

19. The method as recited in claim 16, wherein the one or more application software contained in said step c) is authorized by the server computer system.

20. The method as recited in claim 18, wherein said step d) includes the steps of:

d1) creating a process corresponding to the main executable file;  
d2) running the process;  
d3) monitoring additional requests to access related files from the process by message hooking and file monitoring while the process is running;  
d4) if the process needs any related file, generating a message requesting one or more related files and transmitting the message to the server computer system to fetch the one or more related files based on an on-demand scheme; and  
d5) re-running the process after the one or more related files are delivered to the client computer system.

21 (Amended). A computer-readable media storing program instructions, the program instructions disposed on a computer to perform a method for renting a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and optional files, comprising the steps of:

a) performing a communication connection between a user computer system and a server computer system, wherein the user computer system is based on a user-transparent program install-free technology;  
b) displaying a list of rental software programs downloaded from the server computer system;

- c) selecting the rental software program in the list of rental software programs;
- d) downloading a main executable file associated with the rental software program from the server computer system to run a process corresponding to the main executable file; and
- e) if the process needs one or more optional files, downloading the one or more optional files from the server computer system.

22 (Amended). The computer-readable media as recited in claim 21, wherein said step a) includes the steps of:

- al) performing the communication connection between the user computer system and the server computer system; and
- a2) verifying the user computer system in the server computer system.

23 (Amended). The computer-readable media as recited in claim 21, wherein said step d) includes the steps of:

- d1) downloading the main executable file and a list of optional files from the server computer system, wherein the optional files include a registry file;
- d2) converting registry file information contained in the list of optional files into registry file information appropriate to the user computer system;
- d3) running a file monitor and a protector, which protects the rental software program including the main executable file and the one or more optional files from an unauthorized use committed by the user computer system;
- d4) storing a name of the rental software program selected by the user computer system and a billing start time in a billing information database of the user computer system;
- d5) informing the server computer system of the billing start time; and
- d6) creating and running the process corresponding to the main executable file.

24 (Amended). The computer-readable media as recited in claim 23, wherein said step e) includes the steps of:

- e1) monitoring the process in the file monitor in order to determine whether the process needs the one or more optional files;
- e2) if the process needs the one or more optional files, hooking a message requesting the one or more optional files from process ;
- e3) suspending the process until the user computer system downloads the one or more optional files from the server computer system; and
- e4) if the user computer system downloads the one or more optional files from the server computer system, re-running the process.

25 (Amended). The computer-readable media as recited in claim 22, wherein said step e4) further includes the steps of:

- e4-a) determining whether the pr system.

27 (New). A system for renting a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and one or more optional files, comprising:

- a first means for pulling the main executable file out of a server computer system; and
- a second means for selectively pulling the one or more optional files out of the server computer system.

28 (New). The system as recited in claim 27, further comprising:

- a storage means for storing the main executable file and the one or more optional files pulled out of the server computer system;
- a process manager means for creating and running a process corresponding to the main executable file; suspending the process if the process requests the one or more optional files; and re-running the process if said process manager means receives the one or more optional files; and
- a monitor means for monitoring the process to determine whether the process requests the one or more optional files; and hooking a message requesting the one or more optional files from the process to send the message to the server computer system.

29 (New). The system as recited in claim 28, further comprising:

- a protection means for protecting the rental software program from an unauthorized use; and
- a billing database for storing billing information.

30 (New). The system as recited in claim 29, wherein the billing information includes a billing start time, a billing end time and a name of the rental software program.

31 (New). The system as recited in claim 30, wherein said process manager means flushes the main

executable file and the one or more optional files stored in said storage means when the process is complete.

32 (New). A system for providing a rental software program in a distributed computing environment, wherein the rental software program includes a main executable file and one or more optional files, comprising: a first means for pushing the main executable file into a user computer system; and a second means for selectively pushing the one or more optional files into the user computer system.

33 (New). The system as recited in claim 30, wherein said first and second means are employed in an advertisement.

34 (New). The system as recited in claim 30, wherein said first and second means are employed in a freeware.

35(New). The system as recited in claim 32, further comprising:  
a program database for storing path information of the main executable file, a list of rental software programs and a list of the optional files ;  
an analyzing means for analyzing a new rental software program when the new rental software program is installed, wherein said analyzing means stores the path information of the main executable file and a list of the optional files, associated with the new rental software program, in said program database;  
and  
a storage means for storing the main executable file and the one or more optional files.

36 (New). A system for renting a rental software program, wherein the system includes at least one client computer system and a server computer system and the rental software program includes a main executable file and one or more optional files, comprising: a first means for pulling the main executable file and the one or more optional files; and a second means for selectively pushing the main executable file and the one or more optional files.

37 (New). The system as recited in claim 36, wherein said first means further includes:  
a storage means for storing the main executable file and the one or more optional files;  
a process manager means for creating and running a process corresponding to the main executable file; suspending the process if the process requests the one or more optional files; and re-running the process if said process manager means receives the one or more optional files; and  
a monitor means for monitoring the process to determine whether the process requests the one or more optional files; and hooking a message requesting the one or more optional files from the process to send the message to said second means.

38(New). The system as recited in claim 36, further comprising:  
a protection means for protecting the rental software program from an unauthorized use; and  
a billing database for storing billing information.

39 (New). The system as recited in claim 38, wherein the billing information includes a billing start time, a billing end time and a name of the rental software program.

40 (New). The system as recited in claim 37, wherein said process manager means flushes the main executable file and the one or more optional files stored in said storage means when the process is complete.

41(New). The system as recited in claim 36, further comprising:  
a program database for storing path information of the main executable file, a list of rental software programs and a list of the optional files;  
an analyzing means for analyzing a new rental software program when the new rental software program is installed, wherein said analyzing means stores the path information of the main executable file and a list of the optional files, associated with the new rental software program, in said program database; and  
a storage means for storing the main executable file and the one or more optional files.

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## Operating system abstraction and protection layer

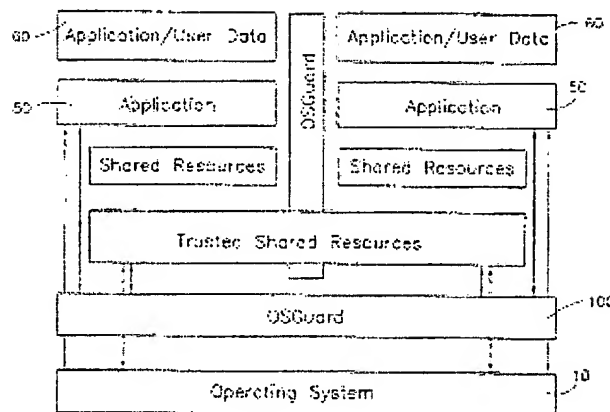
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The present invention provides a system for creating an application software environment without changing an operating system of a client computer, the system comprising an operating system abstraction and protection layer, wherein said abstraction and protection layer is interposed between a running software application and said operating system, whereby a virtual environment in which an application may run is provided and application level interactions are substantially removed. Preferably, any changes directly to the operating system are selectively made within the context of the running application and the abstraction and protection layer dynamically changes the virtual environment according to administrative settings. Additionally, in certain embodiments, the system continually monitors the use of shared system resources and acts as a service to apply and remove changes to system components. The present thus invention defines an "operating system guard." These components cover the protection semantics required by DLLs and other shared library code as well as system device drivers, fonts, registries and other configuration items, files, and environment variables.



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